PHARMACEUTICAL DOSAGE FORMS

Tablets

SECOND EDITION, REVISED AND EXPANDED

In Three Volumes
VOLUME 2

EDITED BY

Herbert A. Lieberman
H. H. Lieberman Associates, Inc.
Consultant Services
Livingston, New Jersey

Leon Lachman
Lachman Consultant Services
Westbury, New York

Joseph B. Schwartz
Philadelphia College of Pharmacy and Science
Philadelphia, Pennsylvania

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PURE SUBSTANCES DIFFERENT SHAPE CONFIGURATIONS INDIVIDUAL PARTICLES

PURE SUB-STANCES AGGLOMERATED BY FREE SURFACE ENERGY, ELECTRO-STATIC FORCES, ETC.

PURE SUB-STANCES AGGREGATED WITH A BINDER

PURE SUBSTANCE COMPACTED AND MILLED

BINARY MIXTURE AGGLOMERATED BY FREE SURFACE ENERGY, ELECTRO-STATIC FORCES, ETC.

BINARY MIXTURE AGGREGATED WITH A BINDER

MULTICOMPONENT MIXTURE

WET GRANULATED . MULTICOMPONENT MIXTURE-MILLED

Figure 21 Several different types of particles encountered in tablet granulation dry blending.

may be found in the reference text: *Handbook of Pharmaceutical Excipients* [33].

Large (sieve size range >60 mesh) dry particles have a tendency to flow better than the smaller dry particles, because they have greater mass. Smaller particles (<100 mesh) may create mixing problems because surface areas are very great, and may give rise to strong electrostatic forces as a result of processing and/or inter-particle friction from movement. These forces may prevent the desired distribution of these smaller particles throughout a mixture because of fine particle agglomeration.

As the particle size approaches 10 μm and below, weak polarizing electrical forces called van der Waals forces or cohesive forces also begin to affect the flow of the powder. Both van der Waals and electrostatic forces usually inhibit powder flow through particle agglomeration as mentioned above. However, in some instances improved flow results because

Table 5 Effect of Particle Size on Powder Flow

Particle size	Type of flow[a]	Reason
200 – 250 μm (10 – 60[b] mesh)	Flow is usually good if shape is not interfering	Mass of individual particles is relatively large
250 – 75 μm (60 mesh – 200 μm)	Flow properties may be a problem with many pure substances and mixtures	Mass of individual particles is small and increased surface area amplifies effects of surface forces
<100 – 75 μm	Flow becomes a problem with most substances	Cohesive forces or free surface energy forces are large as well as static electrical forces relative to particle size

[a]Assume particle shape is constant and does not interfere with flow.

[b]U.S. standard mesh size.

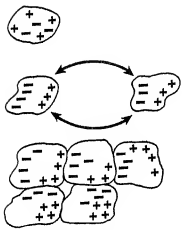

Figure 22 Effect of electrical forces on fine particles.